

Low Flow Spatial Characteristics in Forested Headwater Channels of Southwest Washington

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Spatial characteristics of late summer (dry season) flow in 21 forested headwater channels in the Stillman Watershed (SW Washington) were collected once in August and September 2001, and three to five times from July to October 2002. The location of the uppermost continuous flow (P_p) and the uppermost pool (P_d) were recorded. Annual differences in the P_d and P_p suggest that the primary control on late summer flow in small headwater basins was spring precipitation and not the typically heavy winter precipitation. Annual and seasonal comparisons suggested that the location of P_d varied considerably less than P_p . In 2002, we collected continuous flow data between P_p and the channel head (P_h). These were used to test alternative hypotheses: (A) flow consistently retreats in a downstream direction, versus (B) flow comes from fixed sources along the channel, and will retreat up-channel towards these sources. The dominant spatial characteristic was increased fragmentation, i.e., mixed dry, saturated and watered channel segments. Short high gradient channels ($>30\%$ slope) behaved consistently with Hypothesis B. Longer relatively moderate gradient channels ($10\% < \text{slope} < 30\%$) fragmented without a consistent trend of retreat.

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